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(54) **BOX MADE UP OF BOX ELEMENTS JOINED TOGETHER IN A RELEASABLE AND ARTICULATED MANNER, IN PARTICULAR FOR LIGHT FITTINGS**

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(51) **Int. Cl.**[7] **B65D 43/00**
(52) **U.S. Cl.** **220/4.22**; 220/836; 220/840; 220/841
(58) **Field of Search** 220/4.22, 836, 220/840, 841, 4.24

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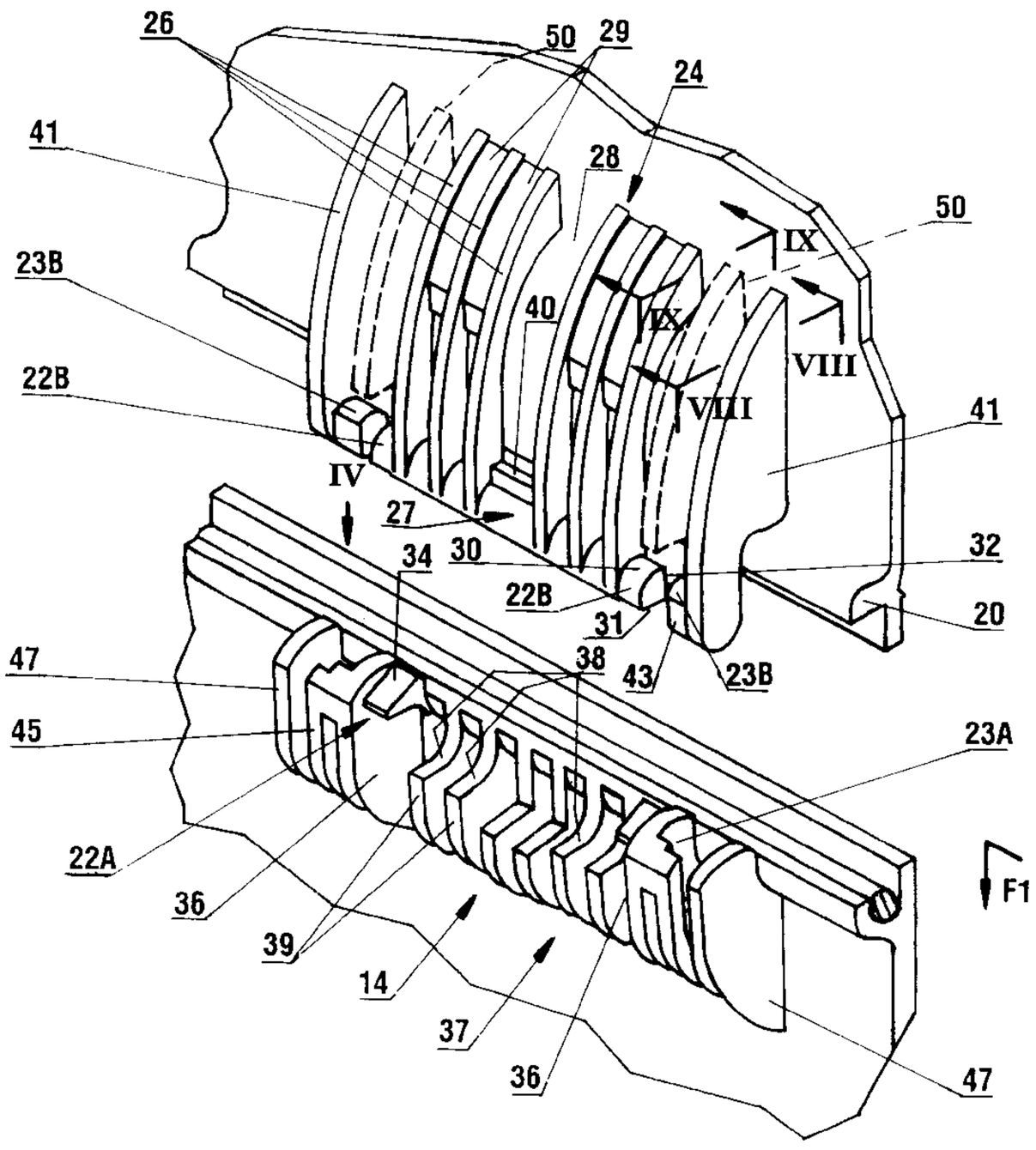
(57) **ABSTRACT**

A box comprises two box elements attached together at a contact surface and connected together in a releasable manner in each of two opposite assembly areas. Each box element includes in each assembly area at least one clipping member which hooks onto a complementary clipping member in corresponding relationship to it on the other box element and at least one journal member which cooperates pivot fashion with a complementary journal member in corresponding relationship to it on the other box element. At least the clipping member of at least one of the box elements is carried by an elastically deformable arm. Applications include boxes for light fittings.

26 Claims, 3 Drawing Sheets



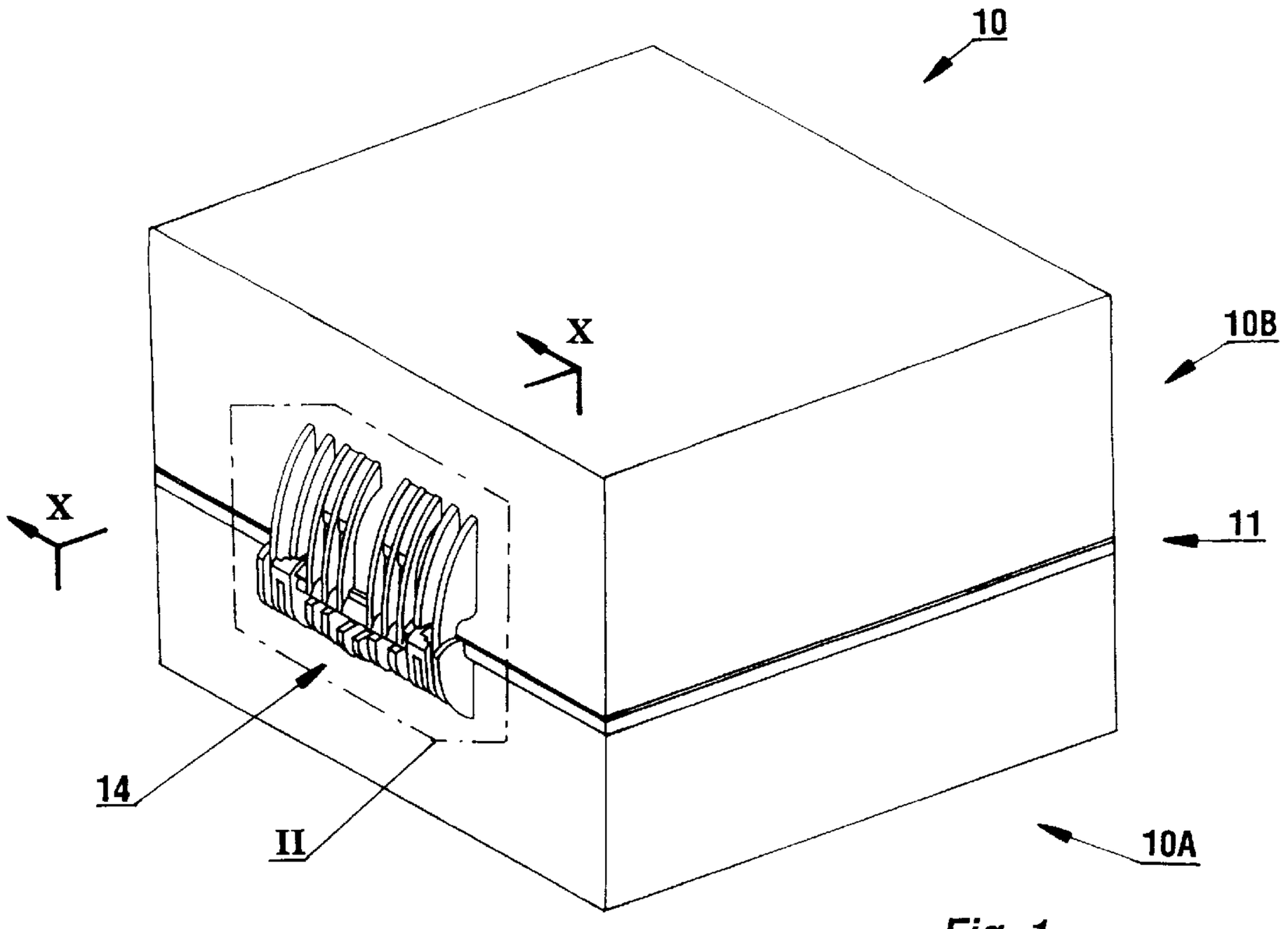


Fig. 1

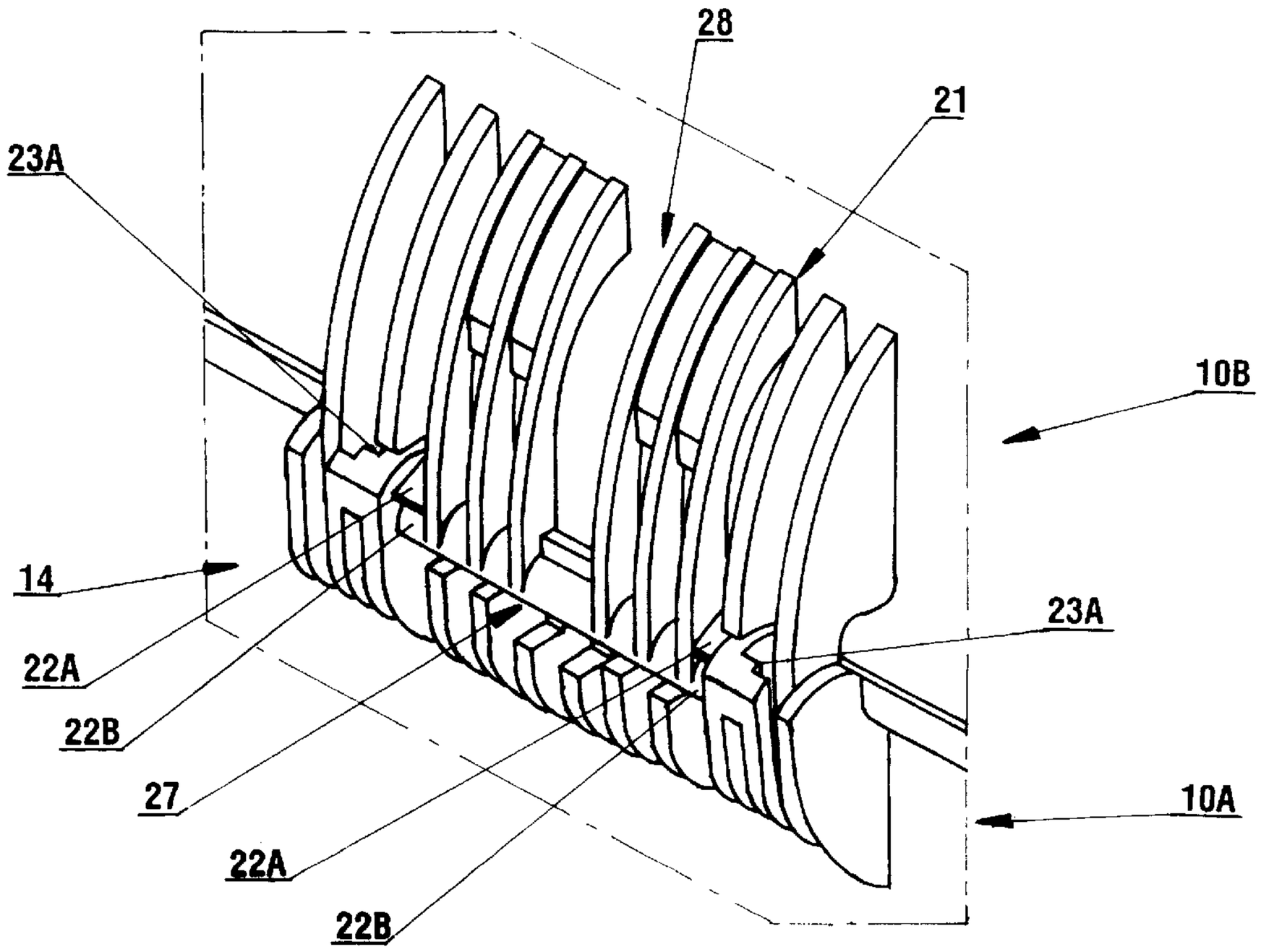


Fig. 2

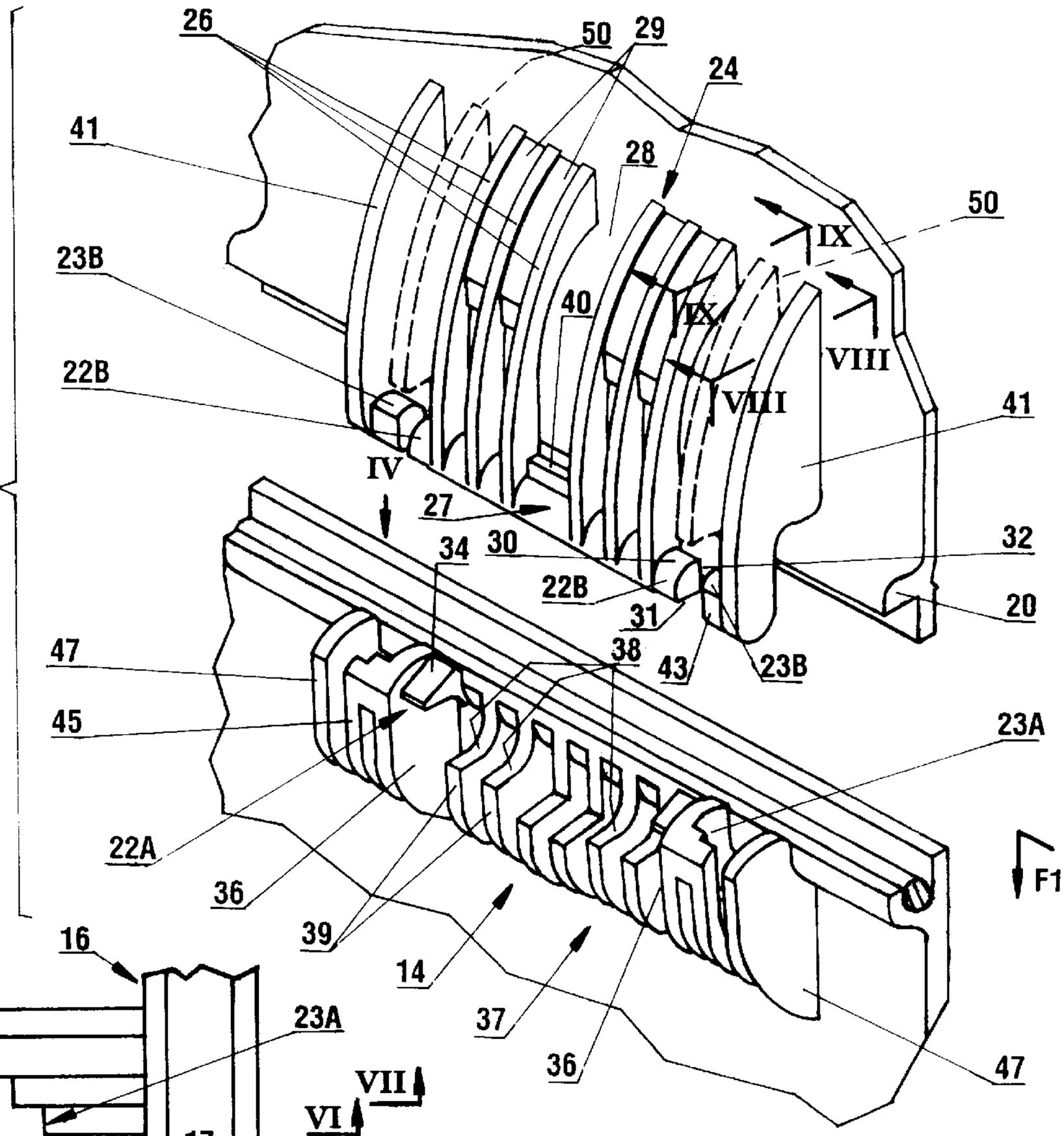


Fig. 3

Fig. 4

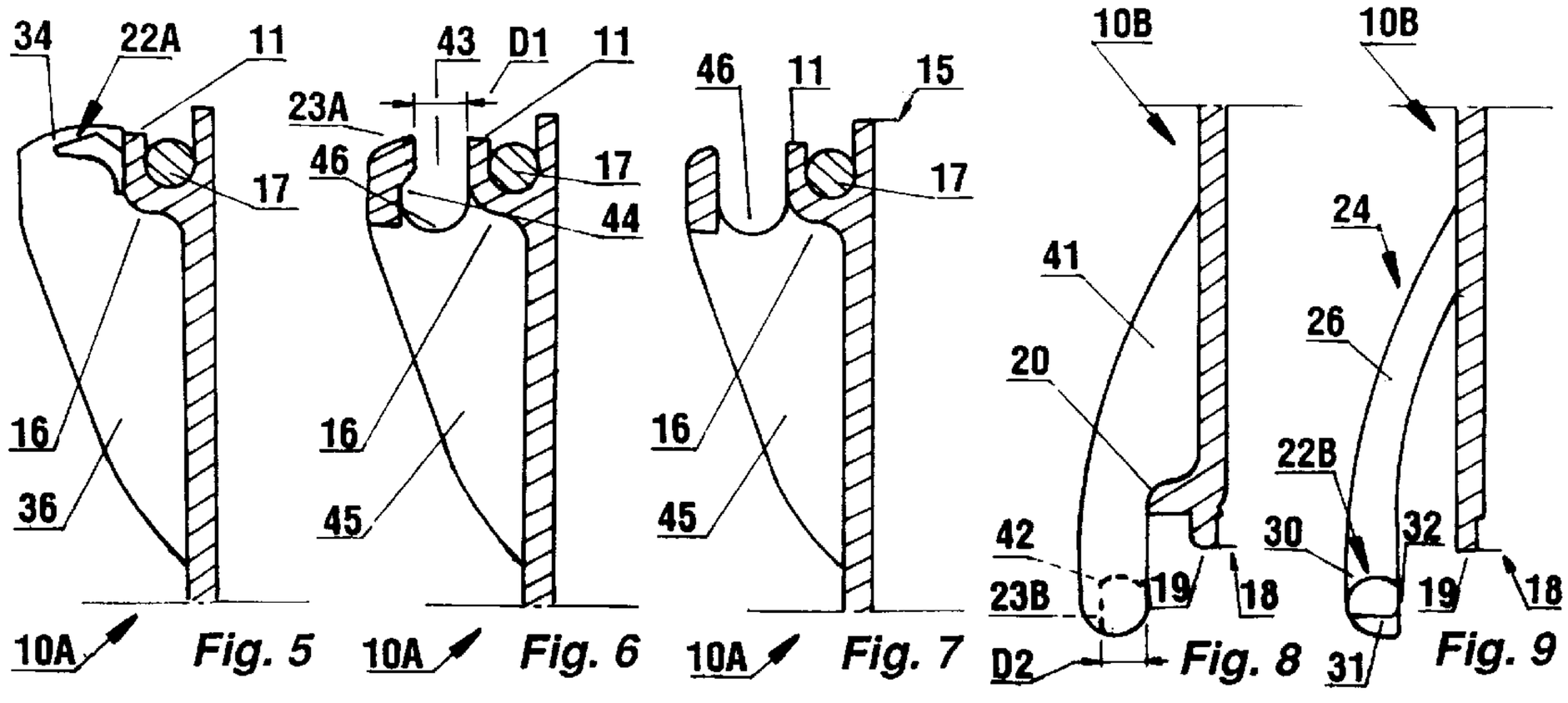


Fig. 5 Fig. 6 Fig. 7 Fig. 8 Fig. 9

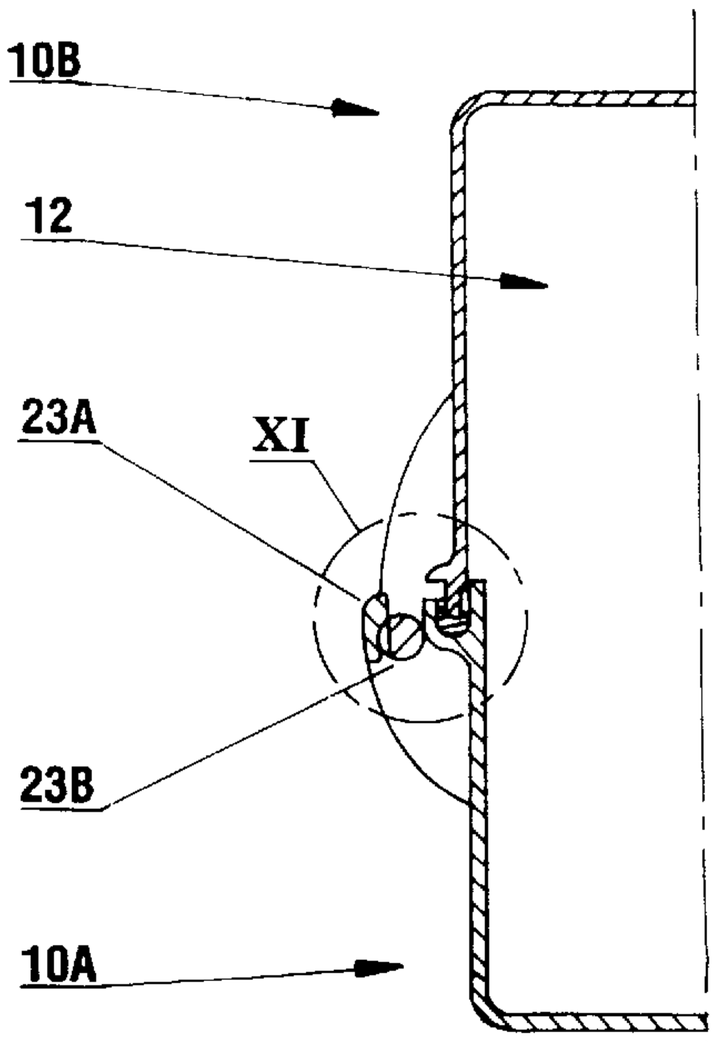


Fig. 10

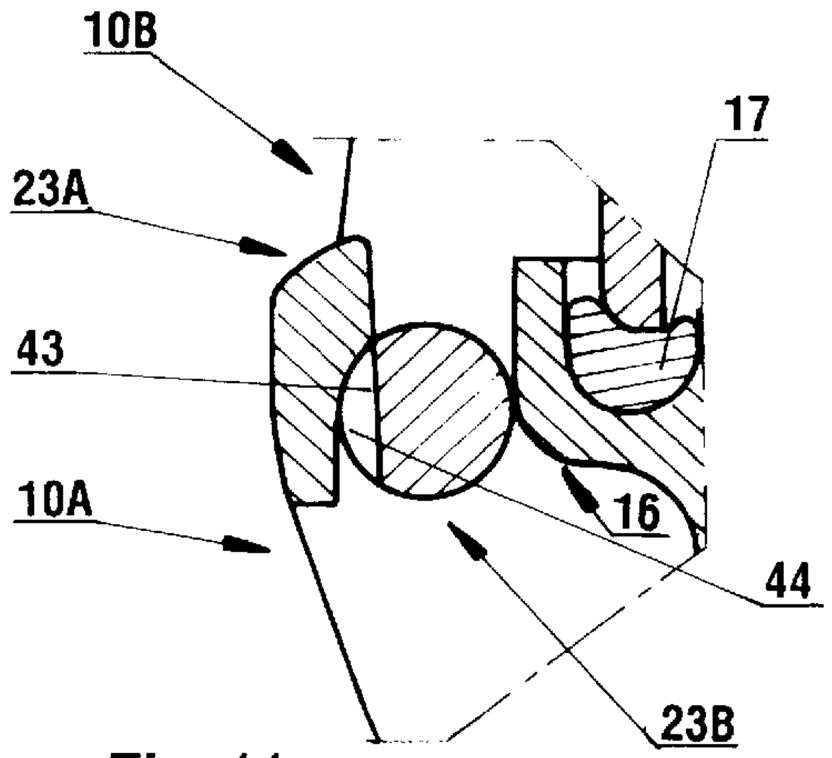


Fig. 11

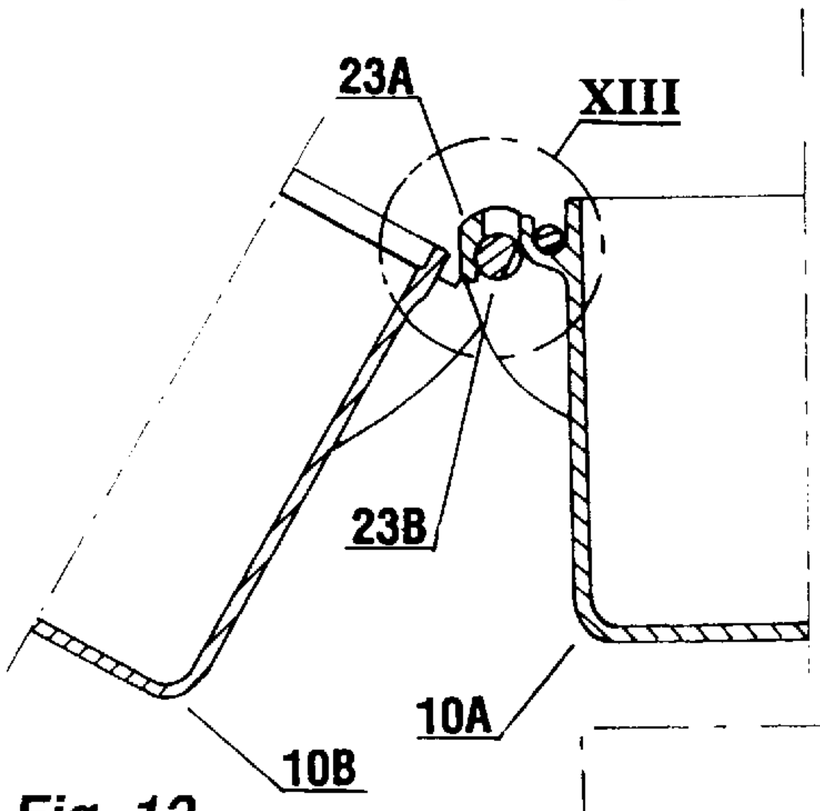


Fig. 12

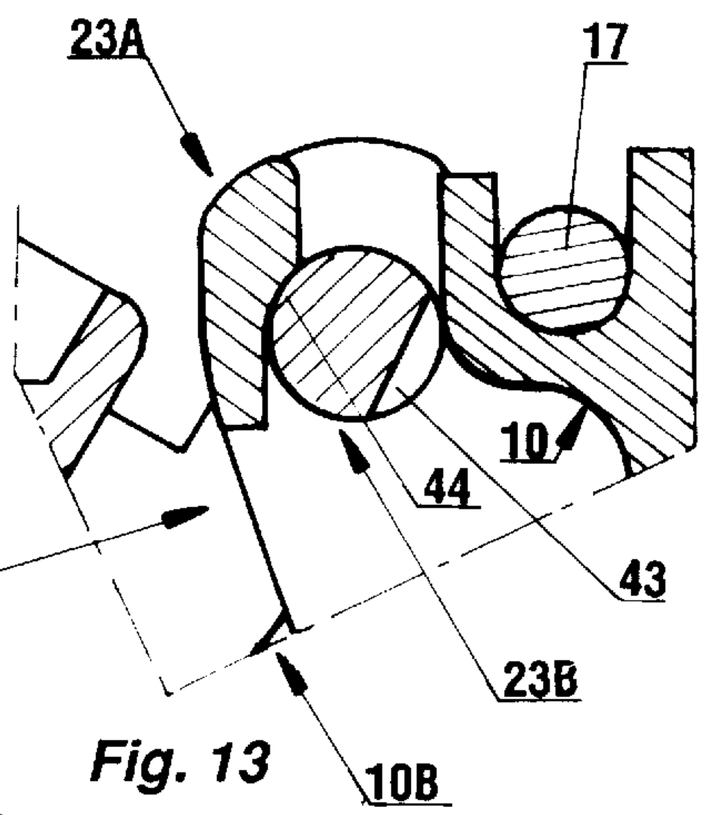


Fig. 13

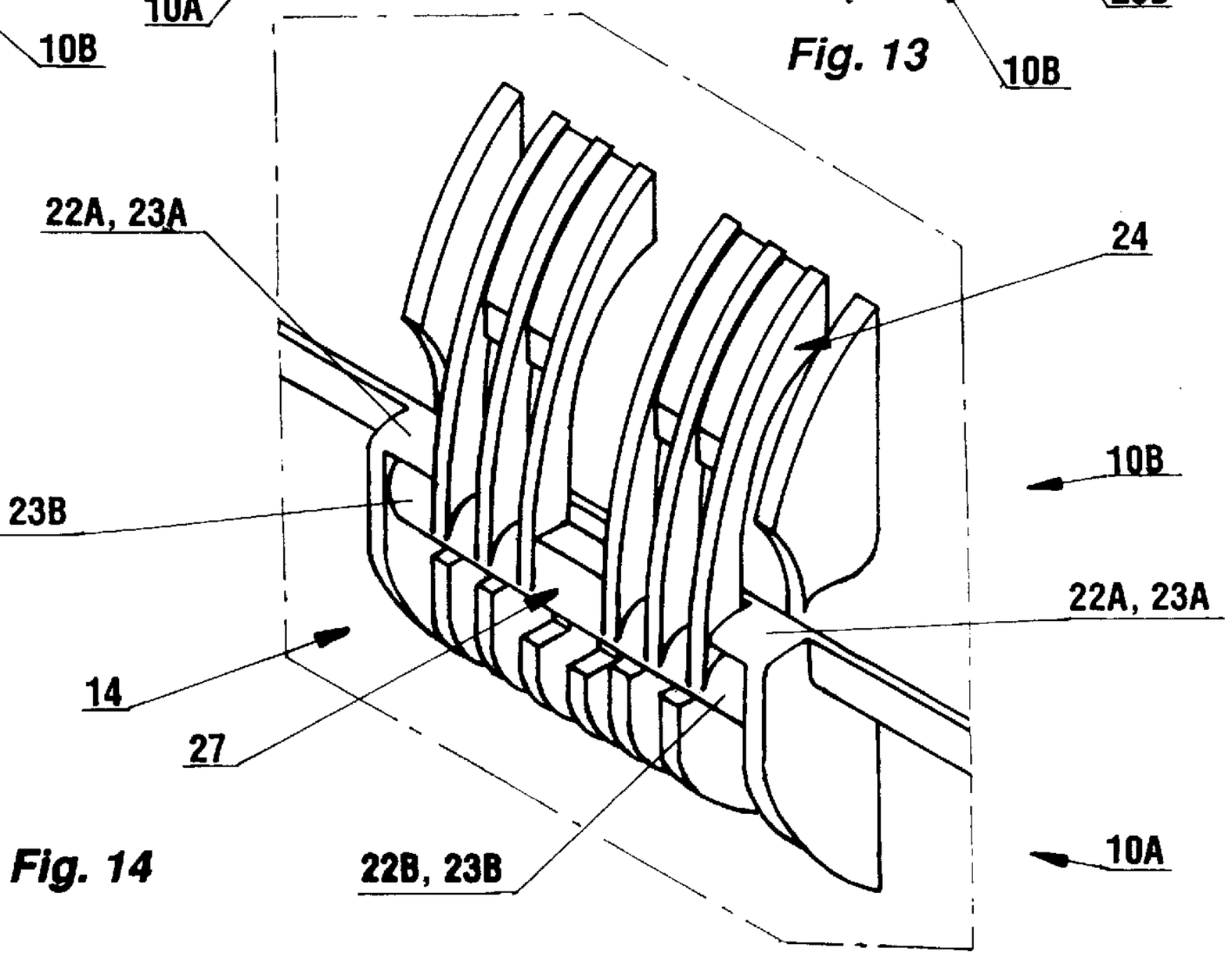


Fig. 14

BOX MADE UP OF BOX ELEMENTS JOINED TOGETHER IN A RELEASABLE AND ARTICULATED MANNER, IN PARTICULAR FOR LIGHT FITTINGS

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention concerns boxes of the kind having two box elements joined together at a contact surface and together defining a housing of any kind and which are joined together in a releasable manner in each of two opposite assembly areas.

Applications of such boxes include light fittings in which, for maintenance reasons, it is frequently desirable to have relatively easy, but nevertheless controlled, access to their interior.

One of the box elements constituting a box of the above kind then constitutes a base adapted for fixing the assembly to a support of any kind and the other box element constitutes a glass, for example, operative in the manner of a cover relative to the base.

A general object of the present invention is an arrangement providing easy and controlled access in a simple and effective manner to the interior volume of boxes of the above type, and also having other advantages.

SUMMARY OF THE INVENTION

To be more precise, the present invention consists in a box comprising two box elements attached together at a contact surface and connected together in a releasable manner in each of two opposite assembly areas, each box element including in each assembly area at least one clipping member adapted to hook onto a complementary clipping member in corresponding relationship thereto on the other box element and at least one journal member adapted to cooperate pivot fashion with a complementary journal member in corresponding relationship thereto on the other box element, wherein at least the clipping member of at least one of the box elements is carried by an elastically deformable arm.

Accordingly the invention associates, in each of the assembly areas between the two box elements, on the one hand, clipping means whereby the box elements can be very easily and quickly joined together, by simple forcible engagement of one on the other, and, on the other hand, journal means enabling the assembly to be opened, if required, without completely separating the two box elements from each other, separating them on one side only and leaving them articulated to each other on the other side.

However, in both cases, whether the separation is on one side only or on both sides, it requires the use of a tool, even if only a screwdriver blade, to operate accordingly on the elastically deformable arm carrying the corresponding clipping member.

It is therefore impossible for anyone without such a tool to separate them and therefore to open the assembly, which is a very simple way of assuring compliance with applicable standards if the box concerned is part of a light fitting.

What is more, both assembly areas of the box in accordance with the invention have clipping means and journal means and each can therefore serve interchangeably and alternately as an opening area or an articulation area, with the result that the box can advantageously be opened from either side.

Finally, because the elastically deformable arm tends to move the box elements between which it operates apart, each assembly area advantageously allows the box in accordance with the invention to be opened wide.

It can preferably be opened to at least 180°.

In a simplified embodiment of the invention the journal member of the box element whose clipping member is carried by an elastically deformable arm is in one piece with the clipping member.

Alternatively, in a preferred embodiment of the invention, the journal member is dissociated from the clipping member and forms a separate part.

In this way it is advantageously possible to optimize the clipping and articulation functions individually.

Because of such dissociation, it is advantageously possible, when one box element is joined to the other, or when it is separated therefrom on both sides, for only the clipping means to be involved, which facilitates their intervention when fitting and when removing it, and when the assembly is opened on one side only the journal means on the other side immediately assume the corresponding assembly function, which assures a permanent assembly function, without risk of unintentional separation of the box elements on this other side.

The features and advantages of the invention will become apparent during the course of the following description given by way of example with reference to the accompanying diagrammatic drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a box in accordance with the invention.

FIG. **2** shows to a larger scale the detail II from FIG. **1**, which relates to one of the assembly areas operative between the two box elements constituting the box.

FIG. **3** is an exploded perspective view of the assembly area.

FIG. **4** is a partial top view of one of the box elements in the assembly area, to a larger scale and as seen in the direction of the arrow IV in FIG. **3**.

FIGS. **5**, **6** and **7** are partial views of the box element in cross section taken along the respective lines V—V, VI—VI and VII—VII in FIG. **4**.

FIGS. **8** and **9** are partial views of the other box element in cross section taken along the respective lines VIII—VIII and IX—IX in FIG. **3**.

FIG. **10** is a partial view of the box in accordance with the invention shown in the closed position and in cross section taken along the line X—X in FIG. **1**.

FIG. **11** shows to a larger scale the detail XI from FIG. **10**.

FIGS. **12** and **13** are views respectively analogous to those of FIGS. **10** and **11** showing the open position of the box in accordance with the invention.

FIG. **14** is a partial perspective view analogous to that of FIG. **2** showing a different embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in the figures, the box **10** in accordance with the invention is of the kind having two box elements **10**A, **10**B attached together at a contacting surface **11**, conjointly defining a housing **12** of any kind, and joined together releasably in each of two opposite assembly areas **14**.

It is a light fitting box **10**, for example.

The box element **10**A then constitutes a base which it adapted to enable the assembly to be attached to a support

of any kind and the box element **10**B then conjointly constitutes a glass, operative in the manner of a cover.

For convenience, it is supposed in the figures that the box **10** has a globally parallelepiped shape and that the two box elements **10**A, **10**B that constitute it are of substantially the same size about a contact surface **11** which is substantially plane.

Obviously this is not necessarily the case, however, in particular with regard to the general shape of the box **10**.

The box elements **10**A, **10**B will not be described in complete detail here.

Suffice to say that, in the embodiments shown, the box element **10**A forms, externally, projecting from its side wall, in the vicinity of its opening **15**, but slightly set back relative thereto, a channel **16** which runs all around it, being open on the same side as the contact surface **11**, to serve as a housing for a gasket **17**, and the free edge of which forms part of the contact surface **11**; conjointly, the box element **10**B forms, around all of its perimeter, at its own opening **18**, in corresponding relationship to the channel **16** on the box element **10**A, a tongue **19** by which it is adapted to compress the gasket **17**, and, externally, projecting from its side wall, a flange **20** which, adapted to be pressed onto the free edge of the channel **16** of the box element **10**A, like the latter, is part of the contact surface **11** and, in practice, is locally interrupted in each of the two assembly areas **14**.

In the embodiments shown, the two assembly areas **14** are operative back-to-back in the middle area of two opposite faces of the box elements **10**A, **10**B, for example in the middle area of their smaller faces, each extending on either side of the contact surface **11**.

The two assembly areas **14**, only one of which can be seen in the figures, are preferably identical.

Only one of them is described here for this reason.

In accordance with the invention, each box element **10**A, **10**B includes in each assembly area **14**, on the one hand, at least one clipping member **22**A, **22**B by means of which it is adapted to hook onto a complementary clipping member **22**B, **22**A in corresponding relationship thereto on the other box element **10**B, **10**A and, on the other hand, at least one journal member **23**A, **23**B by means of which it is adapted to cooperate pivot fashion with a complementary journal member **23**B, **23**A also in corresponding relationship thereto on the other box element **10**B, **10**A; at least the clipping member **22**A, **22**B of at least one of the box elements **10**A, **10**B is carried by an elastically deformable arm **24**.

In the embodiments shown only the clipping member **22**B of the box element **10**B is carried by an elastically deformable arm **24**, and is at its end.

The clipping member **22**A of the other box element **10**A, **10**B, here the box element **10**A, is rigidly joined to the box element.

In the embodiments shown, there are in practice two clipping members **22**B in each of the two assembly areas **14**, at the end of a common elastically deformable arm **24** on the box element **10**B concerned, with two complementary clipping members **22**A in corresponding relationship thereto on the other box element **10**A, **10**B, here the box element **10**A.

As shown here, for example, the two clipping members **22**B extend back-to-back at the free end of the elastically deformable arm **24** that carries them.

As in the embodiments shown, the elastically deformable arm **24** is preferably joined to the box element **10**A, **10**B that carries it, here the box element **10**B, at a distance from the contact surface **11**, and extends cantilever fashion toward that surface.

As shown here, for example, the elastically deformable arm **24** extends beyond the contact surface **11** and therefore beyond the flange **20** of the box element **10**B.

In practice, in the embodiments shown, the elastically deformable arm **24** even extends beyond the free edge of the tongue **19** of the box element **10**B.

In the embodiments shown the elastically deformable arm **24** is divided into parallel flanges **26** which are joined together at their free end by a common crosspiece **27**.

As shown here, for example, six flanges **26** constitute the elastically deformable arm **24** and are divided into two groups of three, with a sufficient gap **28** between the two groups, for reasons that will become apparent hereinafter, to allow the insertion of a tool of any kind, not shown.

In the embodiments shown, the flanges **26** of the same group are joined together in pairs by spaces **29** over a fraction of their length, starting from their root.

In practice the flanges **26** constituting the elastically deformable arm **24** are perpendicular to the side wall of the box element **10**B and perpendicular to the contact surface **11**; conjointly the crosspiece **27** joining the flanges **26** is parallel to the side wall of the box element **10**B and parallel to the contact surface **11**.

In the embodiments shown, the clipping members **22**B carried by the elastically deformable arms **24** are studs projecting laterally at the free end of the elastically deformable arm **24**, each consisting of the respective corresponding end of the crosspiece **27** at this location.

In the embodiments shown there are two journal members **23**A, **23**B on each of the box elements **10**A, **10**B in each of the two assembly areas **14**.

In the embodiment more particularly shown in FIGS. **1** through **13** the journal members **23**B of the box element **10**B whose clipping members **22**B are carried by an elastically deformable arm **24** are dissociated from the clipping member **22**B and so form separate parts.

Likewise, in this embodiment, the clipping members **22**B, on the one hand, and the journal members **23**B, on the other hand, can advantageously have different profiles.

In the embodiment shown in FIGS. **1** through **12** the studs forming the clipping members **22**B carried by the elastically deformable arm **24**, i.e. the studs forming the clipping members **22**B of the box element **10**B, have a globally quarter-cycle profile in cross section with a curvilinear side **30** which extends from the side opposite the side wall of the box element **10**B, a flat **31** parallel to the contact surface **11** and, at right angles thereto, a flat **32** extending from the same side as the side wall of the box element **10**B.

The clipping members **22**A of the other box element **10**A, **10**B, here the box element **10**A, have a globally canopy-shape profile in cross section and, as seen better in FIG. **5**, for example, in the case of one of them, extend substantially parallel to the contact surface **11**.

As shown here, at their top surface, i.e. at the contact surface **11**, the clipping members **22**A are preferably softened by an insertion profile **34** extending generally obliquely toward their free end.

This profile is a rectilinear chamfer or a curved profile, for example.

In the embodiments shown the clipping members **22**A of the box element **10**A in fact have on their top surface a dihedral profile with the point directed toward the contact surface **11**.

In this embodiment, the clipping member **22**A of the box element **10**A have, in cross section, on their bottom surface,

i.e. on the side opposite the contact surface **11**, a circular arc profile subtending an angle of substantially 90° and whose concave side faces away from the contact surface **11**, at substantially 45° thereto.

In the embodiments shown, the outermost side of each clipping member **22**A laterally adjoins a fixed flange **36** which stiffens it.

In practice the clipping members **22**A are spaced apart and face each other on their respective flanges **26** and, at the same level, both are globally set back relative to the contact surface **11**.

In the embodiment shown, a boss **37** is provided between the clipping members **22**A and, to brace the between the clipping members **22**A and, to brace the crosspiece **27** of the elastically deformable arm **24** of the box element **10**B, forms a circular arc shape shoulder **38** parallel to the contact surface **11** and at a lower level than the clipping members **22**A.

In the embodiment shown the boss **37** is in practice divided into parallel flanges **39** offset relative to the flanges **26** forming the elastically deformable arm **24** of the box element **10**B, so that they can be interleaved therewith.

The crosspiece **27** of the elastically deformable arm **24** of the box element **10**B is stiffened by a rib **40** in the gap **28** and the flanges **39** in the middle area of the boss **37** on the box element **10**A are of reduced height so as not to interfere with the rib **40**.

In the embodiment shown each of the journal members **23**B on the box element **10**B is a stud projecting laterally on an individual support arm **41**.

The support arm **41** is preferably rigid.

To this end it is rooted over all of its height to the side wall of the box element **10**B from the flange **20** thereof.

In the embodiment shown, the support arm **41** carrying a journal member **23**B in this way in practice has the same configuration as the flanges **26** constituting the elastically deformable arm **24** carrying the clipping members **22**B, and is parallel to them.

Because two journal members **23**B are provided, there are in practice two support arms **41** and they lie on respective opposite sides of the elastically deformable arm **24** carrying the clipping members **22**B, at a distance from the elastically deformable arm **24**.

In the embodiment shown, the studs forming the journal members **23**B have a globally circular profile in cross section and, in corresponding relationship, they each have on the side opposite the side wall of the box element **10**B a flat **42** substantially perpendicular to the contact surface **11**.

The studs forming the journal members **23**B of the box element **10**B are in practice coaxial with the studs forming the clipping members **22**B of the box element **10**B and extend in opposite directions.

In other words, unlike the two clipping members **22**B, which are back-to-back, the two journal members **23**B extend toward each other.

For each of the journal members **23**B on the box element **10**B the journal member **23**A of the other box element **10**A, **10**B, here the box element **10**A, has a rounded shoulder **44** at the edge of an insertion passage **43** parallel to the contact surface **11**, at the end of the insertion passage **43** opposite the contact surface **11**, with its concave side facing toward the side wall of the box element **10**A, oriented at substantially 45° to the contact surface **11**.

In practice the journal member **23**A is at a distance from the side wall of the box element **10**A and substantially parallel to that side wall, and in the manner of a bridge or a spacer it extends between, on the one hand, the side of the corresponding flange **36** opposite that on which a clipping member **22**A operates and, on the other hand, a flange **45** parallel to the flange **36**, being in one piece with both flanges **36** and **45**.

The flange **45**, which has a configuration similar to that of the flange **36**, has on its edge on the same side as the contact surface **11** a U-shape notch **46** (see FIG. **6**) the back of which forms a cradle for the corresponding journal member **23**B of the box element **10**B.

In practice, the distance D1 between the channel **16** and the journal member **23**A is substantially equal to (slightly greater than) the dimension D2 of the journal member **23**B in line with its flat **42** (see FIG. **8**).

Finally, in the embodiment shown, the box element **10**A also carries, beyond the flanges **45**, flanges **47** for guiding the support arms **41** carried by the box element **10**B which are parallel to the flanges **45** and, like them, have a configuration analogous to that of the flanges **36** and **39**.

As symbolized by an arrow F1 in FIG. **3**, the box **10** in accordance with the invention is assembled by simply engaging one of its box elements **10**A, **10**B forcibly with the other.

On completing this engagement, which is facilitated by the insertion profile **34** of the clipping members **22**A of the box element **10**A, the clipping members **22**B of the box element **10**B engage under the clipping members **22**A, by virtue of temporary elastic deformation of the elastically deformable arm **24** carrying them.

At the same time, by virtue of their flat **42**, the journal members **23**B of the box element **10**B engage between the journal members **23**A of the box element **10**A and the channel **16** thereof until they align with the rounded shoulder **44** of the journal members **23**A, as can be seen in the case of one of them in FIGS. **10** and **11**.

Because of the interconnection of the clipping members **22**A, **22**B, the box elements **10**A, **10**B are then fastened together in each of their assembly areas **14**.

They are separated at one or both of the assembly areas **14**, according to whether they are to be totally or partly separated.

In either case this requires temporary elastic deformation of the elastically deformable arm **24** carrying the clipping members **22**B of the box element **10**B so that, by a movement which is the converse of the previous one, the clipping members **22**B can escape from the clipping members **22**A of the box element **10**A.

A tool is needed for this, however, as mentioned above.

This tool, which can simply be a screwdriver blade, is inserted between the crosspiece **27** carried by the elastically deformable arm **24** and the side wall of the box element **10**B, by virtue of the gap **28** provided for this purpose, and bears on that side wall to apply leverage to the crosspiece **27**.

When only partial separation is required, i.e. separation in only one of the assembly areas **14**, the other assembly area **14** advantageously acts like a hinge, enabling the box **10** to be opened on one side only, as shown in FIGS. **12** and **13**.

At the commencement of opening, the journal members **23**A of the box element **10**A engage under the journal members **23**B of the box element **10**B by virtue of the rounded shoulder **44**, as shown for one of them in FIGS. **12** and **13**, so holding the two box elements **10**A, **10**B interengaged with each other, without risk of them separating unintentionally at this point.

As shown here, the box **10** in accordance with the invention can advantageously open to more than 180°.

Opening can be restricted, if required, by providing flanges **50** on the box element **10**B, for example, as symbolized in chain-dotted line in FIG. **3**, through which the box element **10**B bears on the boss **37** on the box element **10**A.

In the simplified embodiment shown in FIG. **14** the journal members **23**B of the box element **10**B whose clipping members **22**B are carried by an elastically deformable arm **24** are in one piece with the respective clipping member **22**B.

Otherwise their features are substantially the same as previously described.

Of course, the present invention is not limited to the embodiments described as shown, but encompasses any variant execution and/or combination of their various components.

In particular, the respective roles of the two box elements and/or those of their clipping members or their journal members can be interchanged.

Also, at least the clipping members of each box element could be carried by an elastically deformable arm.

What is claimed is:

1. A box comprising two box elements having a mutual contact surface and opposed assembly areas on opposite sides, one of said box elements having in each of the assembly areas at least one journal member engageable for pivotal movement relative to a complementary journal member on the other of said box elements,

a first of said box elements having in each of the assembly areas at least one clipping member releasably engageable with at least one complementary clipping member on a second of said box elements, said at least one clipping member or said at least one of said complementary clipping member being resiliently mounted, said at least one clipping member and said at least one complementary clipping member being separate and distinct from said at least one journal member and said at least one complementary journal member,

whereby said box elements being pivotable relative to each other, selectively at either assembly area.

2. A box as claimed in claim **1**, further comprising an elastically deformable arm releasably mounting said at least one clipping member or said at least one complementary clipping member.

3. A box as claimed in claim **2**, wherein said elastically deformable arm is joined to one of said box elements at a distance spaced from said contact surface, said elastically deformable arm extending cantilever fashion towards said contact surface.

4. A box as claimed in claim **3**, wherein said elastically deformable arm is joined to one of said box elements at a distance spaced from said contact surface, said elastically deformable arm extending cantilever fashion to a location beyond said contact surface.

5. A box as claimed in claim **2**, wherein said elastically deformable arm comprises three parallel flanges and a cross piece joining said parallel flanges together at their free end.

6. A box as claimed in claim **2**, wherein said elastically deformable arm carries said at least one clipping member, said at least one clipping member or said complementary clipping member, having a laterally projecting stud.

7. A box as claimed in claim **6**, wherein said journal member comprises a stud projecting laterally on an individual support arm, said stud being coaxial with said laterally projecting stud defining said at least one clipping member.

8. A box as claimed in claim **7**, wherein said journal member stud and said clipping member stud extend in opposite directions.

9. A box as claimed in claim **6**, wherein said stud has a quarter-circle profile in cross section.

10. A box as claimed in claim **2**, wherein said elastically deformable arm carries at an end thereof said at least one clipping member.

11. A box as claimed in claim **10**, wherein said at least one complementary clipping member is generally of canopy shape profile and extends substantially parallel to said contact surface.

12. A box as claimed in claim **11**, wherein said at least one complementary clipping member has an insertion profile.

13. A box as claimed in claim **11**, wherein said at least one complementary clipping member is rigidly connected to said second box element.

14. A box as claimed in claim **2**, wherein said elastically deformable arm is in one form and one piece with said at least one clipping member.

15. A box as claimed in claim **2**, wherein said elastically deformable arm releasably mounts said at least one clipping member.

16. A box as claimed in claim **2**, wherein two said clipping members are disposed at respective ends of said elastically deformable arms at each of said assembly members on said first box element and wherein two said complementary clipping members are provided on said second box element.

17. A box as claimed in claim **16**, wherein two said clipping members extend back to back at a free end of said elastically deformable arm.

18. A box as claimed in claim **2**, wherein said first box element cooperates with said second box element in a manner of a cover.

19. A box as claimed in claim **2**, wherein said elastically deformable arm releasable mounts said at least one clipping member on said first box element and said at least one journal member on said second box element as a rounded shelder at an edge of an insertion passage and the concave side facing a sidewall of said second box element.

20. A box as claimed in claim **1**, wherein said journal member comprises a stud projecting laterally on an individually support arm.

21. A box as claimed in claim **20**, wherein said support arm of said journal member is rigid.

22. A box as claimed in claim **20**, wherein said stud has a generally circular cross section and a flat substantially perpendicular to said contact surface.

23. A box as claimed in claim **1**, wherein two journal members are provided at each of said assembly areas on each of said box elements.

24. A box as claimed in claim **1**, wherein said two assembly areas are of identical construction.

25. A box comprising two box elements having a mutual contact surface and opposed assembly areas on opposite sides, one of said box elements having in each of the assembly areas at least one journal member engageable for pivotal movement relative to a complementary journal member on the other of said box elements,

a first of said box elements having in each of the assembly areas at least one clipping member releasably engageable with at least one complementary clipping member on a second of said box elements, at least one elastically deformable arm carrying said at least one clipping member or said at least one of said complementary clipping member, said at least one clipping member and said at least one complementary clipping member being

respectively in one piece with said at least one journal member and said at least one complementary journal member,

whereby said box elements being pivotable relative to each other, at selectively at either assembly area.

26. A box as claimed in claim **1**, wherein said at least complementary clipping member is generally set back relative to said contact surface.

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